older formations, Carboniferous-Triassic; in late Tertiary or early Pleistocene times a forest growth was apparently thrown down and soon covered by coarse sediments, after which percolating waters replaced the vegetable matter with silica. The existence of the widespread gravels necessitates belief in an equally widespread plain in late Tertiary or Pleistocene times. An uprising of perhaps a few hundred feet gave opportunity for wearing away the gravels and the upper part of the older formations, and the valley systems broadened and interlocked to produce mesas and outliers, while streams gained a meandering habit to some extent. A second and great uplifting to the present plateau altitude gave opportunity for the greater drainage lines to cut deep trenches with precipitous sides. The subordinate drainage in the Carboniferous limestone region seems to reach the cañon bottoms chiefly by underground channels, the old surface valleys showing small traces of recent work, while on the other hand the development of sink holes has begun. In the sandstone and shale regions the water in part goes underground to the main channels; in part it is carving the plateau surface by a system of 'box cañons.'

The volcanic work would appear to have begun after denudation of the Tertiary or Pleistocene plain had progressed far, but before the second or cañon elevation; the large number of volcanic masses in all stages of destruction evinces a pretty continuous activity until perhaps the last few centuries.

THE ACADEMY OF SCIENCE OF ST. LOUIS, MO., NOVEMBER 4, 1895.

THE Academy held its regular meeting with President Green in the chair and thirty-three members and visitors present.

Prof. Francis E. Nipher, as a committee appointed by President Green, read a memorial of the late Prof. C. V. Riley, dwelling briefly upon Prof. Riley's life and work, and especially his great achievements in the field of economic Entomology.

Prof. H. S. Pritchett presented a communication on 'The Resumé of Certain Studies of the Satellite System of Saturn,' calling attention to the remarkable similarity between this system and the solar system, and also the frequent eclipses to which the satellites of Saturn are subjected.

A very interesting exposition was given of the effect of the attraction of the large satellite Titan upon the smaller Hyperion, resulting in great eccentricity of the orbit of Hyperion and a rapid revolution of its pericentric. Mention was also made of the curious phenomena of the satellite Iapetus being much brighter on one side than on the other, and of its revolution on its axis coinciding with its revolution around the planet.

The paper was followed by a discussion as to the nature of the Saturnian system of rings and satellites.

Prof. Nipher presented a paper on 'The Law of Minimum Deviation of Light by a Prism.'

Adjourned.

A. W. DOUGLAS,
Recording Secretary.

SCIENTIFIC JOURNALS.

JOURNAL OF GEOLOGY, OCTOBER–NOVEMBER.

On the Cliffs and Exotic Blocks of North Switzerland: By E. C. QUEREAU. Certain exotic rock masses occurring along the north border of the Alps and Carpathian mountains have long been more or less a puzzle to geologists. They occur on the Flysch, which is Eocene, while the fossils found in the cliffs have been pronounced by Professors Kaufmann, Steinmann and the author to be Jurassic. Two explanations have been offered for the phenomenon: First, that the cliffs were forced up through the newer rocks. Second, that they were thrust over them. Of these hypotheses the author maintains the latter. He finds the source to the north in a mountain system 'das Vindelisische Gebirge," now buried under the Miocene of the Swiss plain, the existence of which was predicated on entirely different grounds by Professor Studer and other Swiss geologists.

The Preglacial Valleys of the Mississippi and its Tributaries: By FRANK LEVERETT. That drainage systems were greatly changed by the advance of the ice is no longer doubted. The author has in this paper gathered a large amount of data with reference to preglacial

drainage lines in the north part of the Mississippi basin, in the hope that such facts may lead to inferences concerning the preglacial altitude of the region, differential crust movements, the effect of glaciation in enlarging and deepening valleys and other questions relating to glacial influence.

The Classification of the Upper Paleozoic Rocks of Central Kansas: By CHAS. S. PROSSER. This is the concluding portion of the paper begun in the last number of the *Journal*. It gives a detailed study of the paleozoic series from the Waubansee beds of the author in the U. Coal Measures to the Marion beds in the Permian. The paper is a valuable contribution to the stratigraphy of Kansas and its value is enhanced by the table of formations accompanying.

The Volcanics of the Michigamme District of Michigan: By J. MORGAN CLEMENTS. These rocks are Huronian in age and lie to the west of the Archean core between Bone Lake on the north and Crystal Falls on the south. They have a thickness of about 4,000 feet and vary in character from melaphyre and porphyrite to quartz-porphyry and devitrified rhyolites called aporhyolites. As a result of his study of this series, the author confirms the conclusions of many late investigators regarding the identity of these older volcanics with modern lavas and proposes to name them accordingly..

The Influence of Debris on the Flow of Glaciers: By ISRAEL C. RUSSELL. The principle maintained is that the flow of a glacier under given conditions will depend on the percentage of debris mingled with it and will be least when that percentage is greatest. This principle is applied in explaining the irregularities of glacial erosion and deposition, such as subglacial gravel deposits, the formation of complex terminal moraines and the difficult subject, the origin of drumlins. He sees no good reason why we may not have drumlins of sand, loess or gravel, as well as till.

Glacial Studies in Greenland No. VIII: By T. C. CHAMBERLIN. This is mainly a description of the krakokta glacier which descends northerly from the Redcliff peninsula. The relations of this glacier to its moraine are followed with some detail. Where it meets the Tuktoo glacier moving southward, a joint moraine is produced, which perhaps is medial in position, but terminal in nature. At some places the ice lies well within its moraine, and at others the moraine is completely overridden by recent advances of the ice. The photographs illustrate these points as well as the regular and beautiful stratification of the glacier and its freedom from debris, except in the lower portion.

The Editorial: By R. D. SALISBURY gives a condensed account of the Peary Relief Expedition of the present summer, and of the results, geological and otherwise, of Mr. Peary's work during two seasons in Greenland.

Reviews are contributed by J. P. Iddings, T. W. Stanton, S. Weller and T. C. Hopkins.

NEW BOOKS.

Die Artbidung und Verwandtschaft bei bei den Schmetterlingen (Part 2). DR. G. H. THEODOR EIMER. Jena, Gustav Fischer. 1895. Pp. 153.

A Handbook of British Lepidoptera. EDWARD MEYRICK. London and New York, Macmillan & Co. Pp. vi.+843. $325.

Notes on the Nebular Theory. WILLIAM FORD STANLEY, London, Kegan Paul, Trench, Trübner & Co., Ltd. 1895. Pp. xv.+259.

Problems in Differential Calculus. W. E. BYERLY. Boston and London, Ginn & Co. 1895. Pp. vii+71.

The Production of Iron Ores in Various Parts of the World. JOHN BIRKENBINE. Washington. 1895. Pp. 204.

A Handbook of Industrial Organic Chemistry. SAMUEL P. SADTLER. Second Edition. Philadelphia and London, J. B. Lippincott & Co. 1895. Pp. xvii+537.

The Structure and Development of Mosses and Ferns. DOUGLAS HOUGHTON CAMPBELL. London and New York, Macmillan & Co. 1895. Pp. viii+554. $4.50.

Laboratory Manual of Inorganic Preparations. By H. T. VULTÉ and GEO. M. S. NEUSTADT. New York, Geo. Gottsberger Peck. 1895. Pp. ii+180+iii. $2.

Indianische Sagen von der Nord-Pacifischen Küste Amerikas. FRANZ BOAS. Berlin, A. Asker & Co. 1895. Pp. vi+363.